FIL'CHAKOV, P. F.

PA 245T37

USSR/Geophysics - Ground Water

Jan 53

"Hydromechanical Computations for a Dam in the Case of Two Channels and Finite Depth of the Water-Permeable Ground," P. F. Fil'chakov, Inst of Math, Acad Sci Ukrainian SSR

"Dopovidi Ak Nauk Ukrains'koi RSR" No 1, pp 11-16

Derives in closed form the hydromechanical solution of the most general case of a two-slot spillway dam (asymmetrical apron for various heights of the bottom, upstream and down) for finite depth of the water-permeable ground. Also analyzes as a special case a symmetrical two-slot apron. Presented by Acad A. Yu. Ishlinskiy, Acad Sci Ukrainian SSR.

245T37

FIL'CHAKOV, P.F.; ISHLINS'KYY, O.Yu., diysnyy chlen.

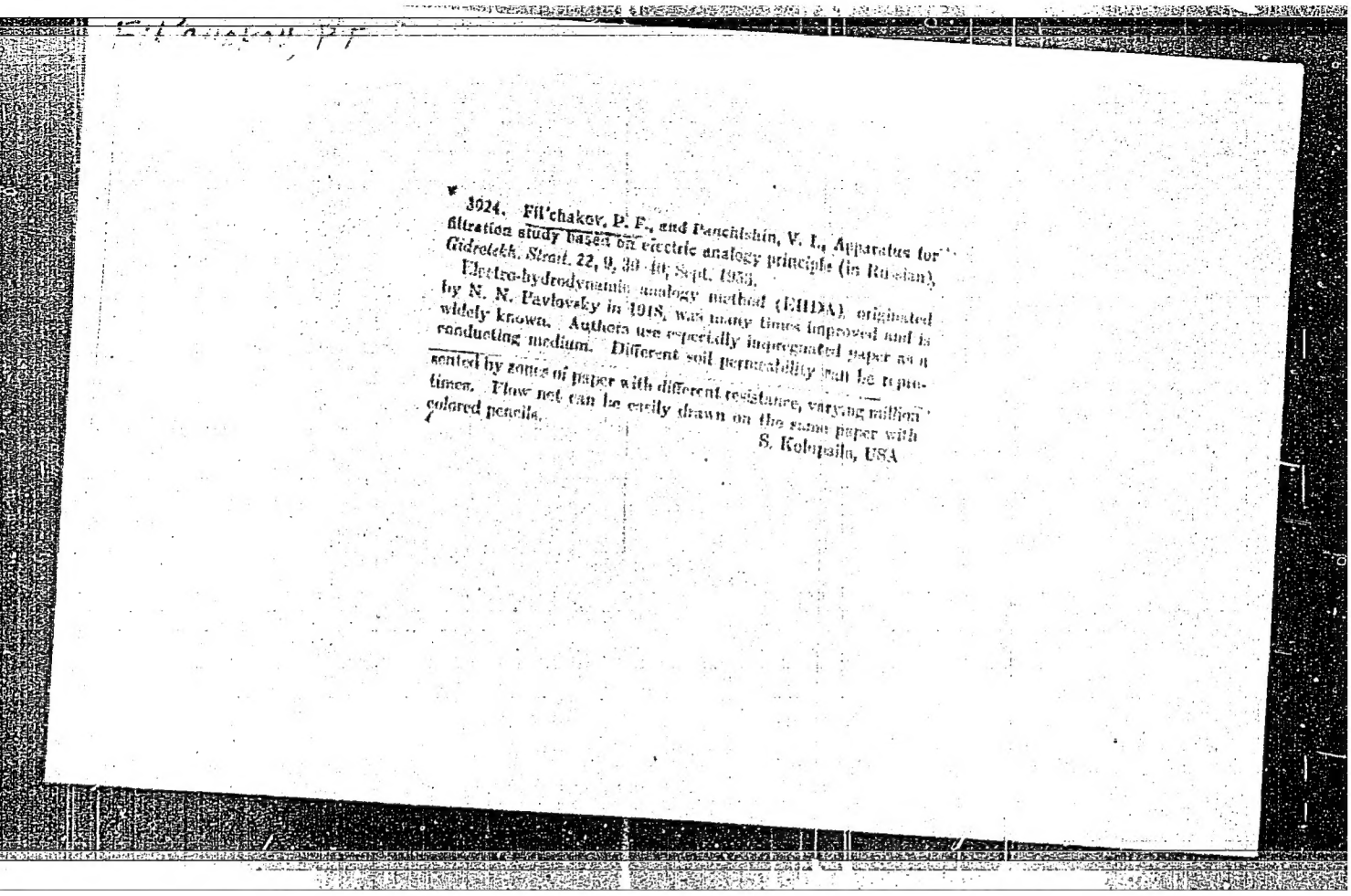
On the problem of determining the Christoffel-Schwartz constant in hydromechanical calculations for double-pile cofferdams. Dop.AN URSR no.5:317-322 '53. (MLRA 6:10)

1. Akademiya nauk Ukrayins'koyi RSR (for Ishlins'kyy). 2. Instytut matematyky Akademiyi nauk Ukrayins'koyi RSR (for Fil'chakov). (Cofferdams)

SENKOV, O.M.; FIL'CHAKOV, P.F.

Electric models in the solutions of hydraulic problems in free water flow. Dop.AN URSR no.6:394-393 '53. (MLRA 7:1)

1. Institut matematiki Akademii nauk Ukrainy'koi RSR. Predstaviv diysniy chlen Akademii nauk Ukrains'koi RSR O.M.Savin.
(Hydraulic models)



3024. Fil'chakov, P. F., and Panchishin, V. I., Apparatus for filtration study based on electric analogy principle (in Russian), *Gidrotekh. Strait.* 22, 9, 30–40, Sept. 1953.

Electro-hydrodynamic analogy method (EHDA), originated by N. N. Pavlovsky in 1918, was many times improved and is widely known. Authors use especially impregnated paper as a conducting medium. Different soil permeability can be represented by zones of paper with different resistance, varying million times. Flow net can be easily drawn on the same paper with colored pencils.

S. Kobrpaila, USA

FIL'CHAKOV, P.F., kandidat fiziko-matematicheskikh nauk.

Horizontal and vertical paths of percolation. Gidr.stroi. 22 no.10:25-30 O '53. (MLRA 6:10)
(Soil percolation)

FIL'CHAKOV, P. F.

PA 24915

USSR/Physics - Filtration 1 Jan 53

"Method for Determining the Hydromechanical Effect of a Channel," A. M. Senkov and P. F. Fil'chakov, Inst of Math, Acad Sci Ukrainian SSR

DAN SSSR, Vol 88, No 1, pp 29-32

In a previous article (ibid. 83, No 6 (1952)) the authors discussed a new method for determining the hydromechanical effect of a channel groove or slot for the case of infinite depth of the water permeable layer. In this article they discuss the method for the case of finite depth for certain assumptions:

24915

homogeneous water-permeable ground, absence of contact filtration, and absolutely water-permeable channel. Presented by Acad A. I. Nekrasov
31 Oct 1952

24915

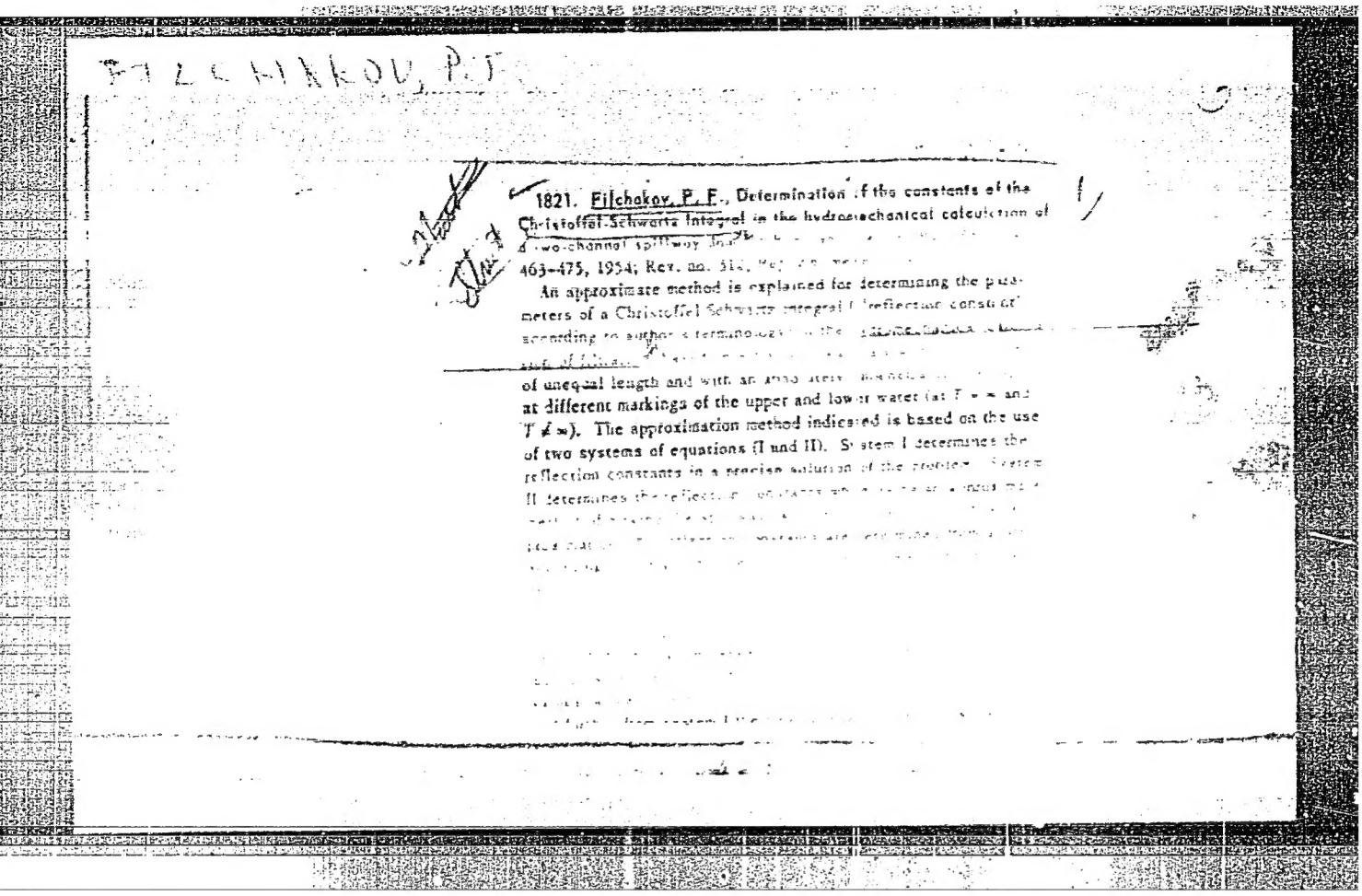
FIL'CHAKOV, P.F.

Direct approximation method for the hydromechanical calculation of aprons. Dokl.AN SSSR 93 no.3:425-428 N '53. (MLRA 6:11)

1. Institut matematiki Akademii nauk Ukrainskoy SSR. Predstavleno akademikom A.I.Nekrasovym. (Spillways)

~~FIL'CHAKOV, P.F.~~ FIL'CHAKOV, P.F.
~~FIL'CHAKOV, P.F.~~

USSR/ Fil'čakov, P. F. An engineering method of computing the filtration under the apron of hydraulic structures. MS 1-F/11
Ukrain. Mat. Ž. 6, 233–244 (1954). (Russian)



FILCHAKOV, P.F.

1821. Filchakov, P. F., Determination of the constants of the Christoffel-Schwartz integral in the hydromechanical calculation of a two-channel spillway [illegible]
463–475, 1954; Rev. no. 514, Mekh. [illegible]

An approximate method is explained for determining the parameters of a Christoffel Schwartz integral [reflection constants] according to author's terminology [illegible] of unequal length and with an [illegible] at different markings of the upper and lower water (at $T = \infty$ and $T \neq \infty$). The approximation method indicated is based on the use of two systems of equations (I and II). System I determines the reflection constants in a precise solution of the problem. System II determines the reflection [illegible]

FILCHAKOV, P.F.

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the second step, etc. Calculation of the successive approximations is continued until the given dimension of the spillway agrees with the dimensions obtained in the last step within the limits of the accepted accuracy of the calculations. For illustration of the above method of determining the reflection constants, several numerical examples are examined. Evidence of the convergence of the process of successive approximation when determining the reflection constants is not given in the work.

Courtesy of Referativnyi Zhurnal S. N. Numerov, USSR
Translation, courtesy Ministry of Supply, England

FIL'CHAKOV, P.F.

Vlagovessenskiĭ, Yu. V., and Fil'chakov, P. F. Solution of plane problems of the flow and heading by the method of electrohydrodynamical analogy. Ukrain. RSR. Prikl. Mekh. 1 (1955), 195–204. (Ukrainian. Russian summary)

An approximate method of solution of the [illegible] problem is described as a sequence of solutions of the problem for a circle. Given an arbitrary, simply-connected region D, whose boundary is composed of a finite number of arcs each with continuously turning tangent. Circumscribe a circle K about D, which may coincide with the boundary of D at some points. Choose the values of the potential ϕ on the boundary of K so that as nearly as can be determined the resulting values of ϕ on the boundary of D will be as close as possible to the given values. Solving the Dirichlet problem for K then gives an approximate solution, ϕ_0, for D. A Fourier series expansion for ϕ is then used to find the values of ϕ_0 on the boundary of D. Define the error function ϕ_1 as the difference between ϕ_0 and the exact values of ϕ on D. Then ϕ_1 is harmonic in D. Choose the boundary values of ϕ_1 on D as the difference between the computed values of ϕ_0 and the values given originally. Thus ϕ_1 satisfies a Dirichlet problem in D. Again solve this problem for the circumscribed circle K in the same manner as above. This

process may be repeated as often as necessary to obtain a desired degree of approximation.

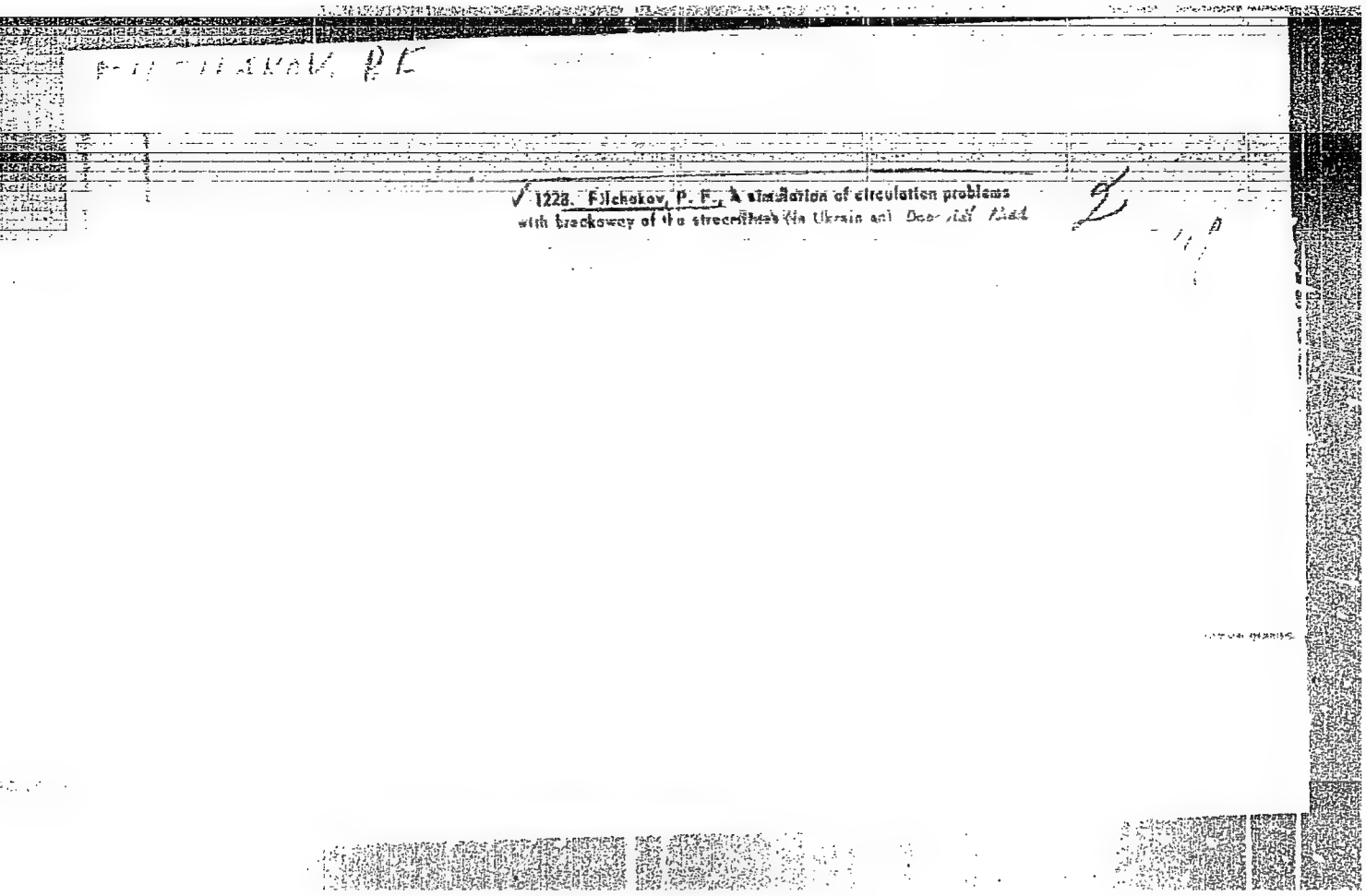
Results are indicated for the torsion problem of an equilateral triangle where the boundary values of the potential satisfy $\phi = \frac{1}{2}r^2$, where r is the radius vector. The second approximation is shown to be sufficient for this problem.

Reference is made to an electrodynamical analogue computer which can be used to solve the potential problem. *H. P. Thielman and H. J. Weiss.*

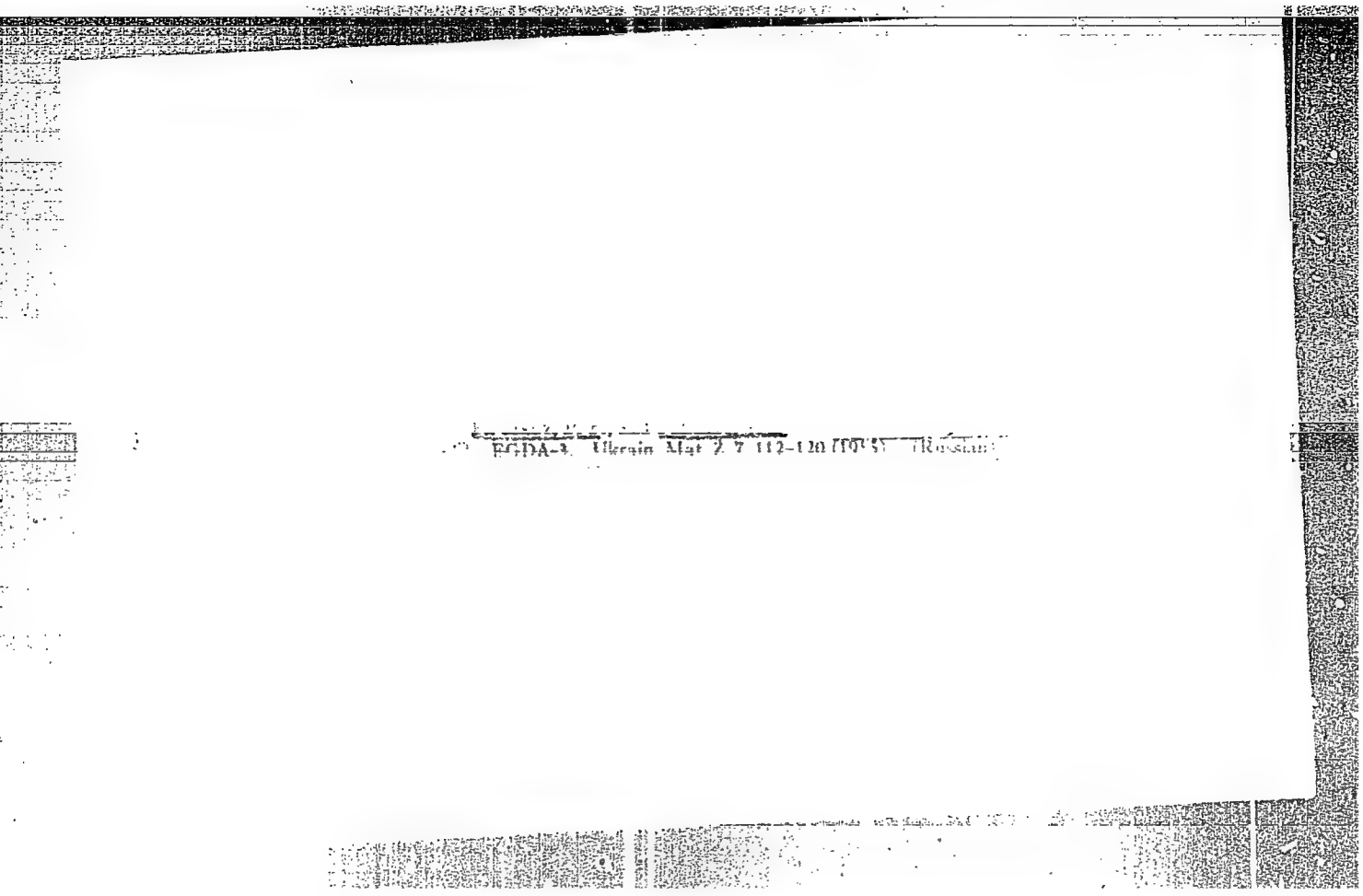
OSTAPENKO, V.M.; FIL'CHAKOV, P.F.; SHAMANS'KIY, V.E.

Use of models in the study of plane circulating currents. Dop. AN URSR no.1:16-20 '55. (MLRA 8:7)

1. Institut matematiki AN URSR. Predstaviv diysniy chlen AN URSR O.Yu.Ishlins'kiy. (Fluid dynamics) (Hydraulic models)



1228. Filchakov, P. F. A simulation of circulation problems with breakaway of the streamlines (in Ukrain and Deutsch). Mat.



FIL'CHAKOV, P.F.

Nomograms for computing the filtration of a plane spillway (2 nomograms inserted). Ukr.mat.zhur.7 no.3:343-346 '55. (MLRA 9:2)
(Spillways) (Nomographs (Mathematics)) (Soil percolation)

FIL'CHAKOV, P.F. (Kiyev)

Method of sequential conformal mapping and its application to filtration problems. Part 1. Ukr.mat.zhur. 7 no.4:453-470 '55. (MLRA 9:5)

(Conformal mapping) (Soil percolation)

FIL'CHAKOV, P. F.

USSR/ Mathematics - Mapping

Card 1/1 Pub. 22 - 6/51

Authors : Fil'chakov, P. F.

Title : About the method of successive conformal mappings

Periodical : Dok. AN SSSR 101/1, 25-28, Mar 1, 1955

Abstract : A method of successive mappings is analyzed. As an example, the mapping of the underground contour of a single channel dam is considered. Two USSR references (1953).

Institution : Academy of Sciences, The Institute of Mathematics

Presented by : Academician M. A. Lavrent'ev, December 1, 1954

NEL'SON-SKORNYAKOV, F.B.

"Approximate underground methods for calculating the stationary flow of waters under hydraulic engineering structures." A.M. Senkov, P.F. Fil'chakov. Reviewed by F.B. Nel'son-Skorniakov. Prykl. mekh. 2 no.1:108-110 '56. (MLRA 10:2)

(Water, Underground) (Hydraulic engineering)

PIL'CHAKOV, P.F. (Kiyev)

Method of sequential conformal mappings and its application to filtration problems. Part 2. Case of the arbitrary line of the impervious level. Ukr.mat.zhur.8 no.1:76-91 '56. (MLRA 9:7)
(Soil percolation) (Conformal mappig)

FIL'CHAKOV, P.F.

Method of successive conformal mappings and its application seepage problems. Part 3: The case of close location of sheet piles; Plane seepage; Seepage in an anisotropic soil. Ukr. mat. zhur. 8 no.3: 299-318 '56. (MLRA 10:9)

(Conformal mapping) (Piling (Civil engineering))
(Soil percolation)

FIL'CHAKOV, P.F., doktor fiziko-matematicheskikh nauk.

Graphic-analytic method of calculating seepage in dam aprons.
Gidr.stroi. 25 no.10:43-50 N '56. (MLRA 9:12)
(Water, Underground) (Dams)

AUTHOR: Fil'chakov, P.F. SOV/41-10-3-12/14

TITLE: Numerical Determination of the Constants of the Integral of Christoffel-Schwarz (Chislennyy metod opredeleniya konstant integrala Kristoffelya - Shvartsa)

PERIODICAL: Ukrainskiy matematicheskiy zhurnal, 1953, Vol 10, Nr 3, pp 340 - 344 (USSR)

ABSTRACT: The method already formerly applied by the author [Ref 3] in special cases consists in the following : A triangle is circumscribed about the polygon given so that they have in common one corner and a part of the sides. The triangle is mapped onto the plane so that the common angle comes into the infinite point. Then a half plane with a series of sectors corresponds to the polygon. These sectors are eliminated with the aid of corresponding elementary mappings, whereby it is possible to determine arbitrarily exactly the constants of the Christoffel - Schwarz integral. The method can be modified for open polygons too.
There are 3 figures, 1 table, and 3 Soviet references.

Card 1/2

16(1)

AUTHOR: Fil'chakov, P.F. (Kiyev) SOV/41-10-4-9/11

TITLE: Numerical Method of the Conformal Mapping of Simply Connected Schlicht Domains (Chislennyy metod konformnogo otobrazheniya odnosvyaznykh odnolistnykh oblastey)

PERIODICAL: Ukrainskiy matematicheskiy zhurnal, 1958, Vol 10, Nr 4, pp 434-449 (USSR)

ABSTRACT: The author considers the mapping of a simply connected and schlicht domain onto the interior of the unit circle $|\zeta| \leq 1$ or onto the halfplane. He uses the method of successive mappings proposed by him for single cases already some times ago [Ref 7,8,9]. The given domain, the boundary of which is allowed to have a finite number of corner points, at first is mapped onto a halfplane having a number of cuts and other irregularities. With the aid of elementary mappings these irregularities are removed step by step so that after n steps the obtained domain is arbitrarily little different from the halfplane for a sufficiently large n. Three examples are calculated.
There are 4 tables, 6 figures, and 9 Soviet references.

SUBMITTED: December 10, 1957

Card 1/1

SELICHAKOV, P.F.

28(1) PHASE I BOOK EXPLOITATION SOV/2775

Akademiya nauk Ukrayins'koyi RSR. Instytut matematyky

Zastosuvannya metodu elektrohidrodynamichnykh analohiy do rozv"yazannya deyakykh tekhnichnykh zadach (Application of the Method of Electrohydrodynamic Analogy to the Solution of Various Engineering Problems) Kyyiv, Vyd-vo AN URSR, 1959. 160 p. 1,000 copies printed.

Ed. of Publishing House: T.K. Remennik; Tech. Ed.: O.O. Matviychuk; Editorial Board: P.F. Fil'chakov (Resp. Ed.), V.M. Ostapenko (Resp. Secretary), Yu.V. Blahoveshchens'kyy, Y.B. Pohrebys'kyy, and V.E. Shamans'kyy.

PURPOSE: This book is intended for scientific workers, engineers, Aspirants and students.

COVERAGE: This book is a collection of articles on the application of the electrohydrodynamic analogy method to the solution of various engineering problems. Among the topics discussed is the modelling of certain technical problems on resistance paper by the electrohydrodynamic analogy method. Special attention is given to the study of various problems of filtration, in both homogeneous and nonhomogeneous ground, problems of plane bending, heat engineering problems, modelling electro-osmotic waterlevel fall, and the conformal mapping problem. Problems of the physical and technical properties of resistance paper and the accuracy of the electrohydrodynamic analogy method are studied and the new, more universal model of the EGDA integrator is described. All the articles end with summaries in Russian and English.

TABLE OF CONTENTS:

PHASE I BOOK EXPLOITATION SOV/5637

Fil'chakov, Pavel Fedos'yevich

Teoriya fil'tratsii pod gidrotekhnicheskimi sooruzheniyami, t. 1 (The Theory of Percolation Beneath Hydrotechnical Structures; v.1) Kiyev, Izd-vo AN UkrSSR, 1959. 307 p. 4,000 copies printed.

Sponsoring Agency: Akademiya nauk UkrSSR. Institut matematiki.

Resp. Ed.: Yu. D. Sokolov, Corresponding Member, Academy of Sciences UkrSSR; Ed. of Publishing House: O. M. Pechkovskaya; Tech. Ed.: V. Ye. Sklyarova.

PURPOSE: This book is intended for scientists, engineers, and students of hydraulic engineering.

COVERAGE: The book discusses calculation of the percolation beneath hydrotechnical structures. It is divided into two self-contained sections: Vol. I, which describes an accurate method for calculating filtration, and Vol. II (SOV/5638), which describes approximate hydromechanical and EGDA [modeling of filtration problems on conducting paper] methods.

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The calculation method discussed in Vol. I is based on the theory of Academician N. N. Pavlovskiy. Application of the approximation methods of Academician M. A. Lavrent'yev to this theory makes possible 1) the solution of a problem set for homogeneous soil in the most general form, i.e., for a weir foundation with a practical profile and arbitrary line of bed-level, and 2) the development of a grapho-analytical method of computing filtration, which permits calculations of uplift pressure, velocity of retreat , and discharge for any apron with a practical profile and with finite and infinite depths of permeable soil to be carried out in 20-30 minutes. Basic results of this work were presented and discussed several times during the seminars of G. N. Savin and A. Yu. Ishlinskiy in the Department of Technical Sciences, AS UkrSSR. The author thanks E. V. Gnedenko, M. M. Grishin, P. Ya. Polubarinova-Kochina, A. M. Senkov, Yu. D. Sokolov, and M. A. Lavrent'yev for their help. There are 78 references: 61 Soviet, 6 English, 5 French, 5 German, and 1 Italian.

TABLE OF CONTENTS:

16 (SOV/21-59-6-4/27

AUTHORS: Fil'chakov, P. F., and Panchishin, V. I.

TITLE: On Modelling Potential Fields on Resistance Paper Under Boundary Conditions of the 1-st, 2nd and 3rd Kinds

PERIODICAL: Dopovidi Akademii Nauk Ukrains'koi RSR, 1959, Nr 6, pp 578 - 586 (USSR)

ABSTRACT: The authors introduce the application of thin linear bars for the realization of functional boundary conditions of the first kind (Dirichlet's problem) in modelling on resistant paper, and describe the technique of their preparation. In the majority of cases the conditions under which the potential u = const. or

$$\frac{du}{dn} = 0$$

are sufficient for the realization of boundary conditions in modelling on resistant paper, of the bulk of problems arising in the theory of filtration, hydro- and aerodynamics, electric- and radio engineering, electronic optics and other

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On Modelling Potential Fields on Resistance Paper Under Boundary Conditions of the 1st, 2nd and 3rd Kinds

fields of mathematical physics. However, there exists a great number of important technological problems the modelling of which calls for realization of boundary conditions of the I - II - III kinds:

$$u = f_1(s); \quad \frac{du}{dn} = f_2(s); \quad A(x,y)\frac{du}{dn} + B(x,y)\,u = f_3(s),$$

$$(A \geqslant 0; \quad B \geqslant 0), \qquad (1)$$

where f_1, f_2, f_3 are assigned functions of the length of arc of boundary s. Boundary conditions of the 2nd and 3rd kind can be presented by means of the method of successive approximations to equivalent boundary conditions of the 1st kind. The modelling on resistance paper of boundary problems of functional boundary condition (1) can easily be achieved with the use of thin linear rods, which are prepared as follows: PEB-1 or PEM-1 copper enamel wire 1.2 - 2.0 mm is stretched in a tension device, covered with BF-2 glue

and wound around with PEShOM or PShDM manganin wire, or PEShOK or PShDK constantan wire 0.12 - 0.20 mm. The winding is then soaked with a 1:1 solution of BF-2 glue and spirit, polymerized in a drying chamber for 1 hour at 100 - 120°C, then polished with a fine emery cloth. Then the wire is provided with lengths of thin multicore cable (MGShD, MGV-0.20, or other) for connection to assigned potentials, attached to the wire ends and interjacent sections. Now the rod is glued onto the resistance paper model, with an electro-conductive glue consisting of 35 g of dope, 1 g of BF-2 glue and 7 g of carbon black. At first the glue is applied to the lower part of the rod, which is then put on the resistant paper and pressed to it, whereupon the glue is applied to the outer part of rod, and the latter is left for 3 - 5 minutes, to take hold. The authors demonstrate the application of the prepared rods for the solution of two problems, for illustration. Tables 1 and 3 show the correlation of the

On Modelling Potential Fields on Resistance Paper Under Boundary Conditions of the 1st, 2nd, and 3rd Kinds

theoretical values of the u_t potentials with the results of the electric analogy of u_e for control problems 1 and 2 respectively, with boundary conditions of the 1st and 3rd kinds. The precision obtained is quite sufficient for the modelling of many technical problems. Figure 2 presents a photo of the equipotential net for a modification of problem 1 in the case of heterogeneous medium and shows the measuring device of the EGDA-6/53 integrator on which the modelling was carried out, and which is described in references 1 and 2.
There are 3 tables, 2 graphs, 1 photo and 2 Soviet references.

ASSOCIATION: Institut matematiki AN UkrSSR (Institut of Mathematics of the AS UkrSSR)

PRESENTED: By A. Yu. Ishlinskiy, Member, AS UkrSSR
SUBMITTED: January 12, 1959

SOV/98-59-6-9/20

AUTHOR: Fil'chakov, P.F., Doctor of Physical-Mathematical Sciences, Professor

TITLE: The Filtration Calculation for Flood Beds in Two-Bedded Grounds

PERIODICAL: Gidrotekhnicheskoye stroitel'stvo, 1959, Nr 6, pp 30-34 (USSR)

ABSTRACT: The author proposes an analytical and graphic method of an approximate filtration calculation for flood beds in two-bedded grounds, the upper bed being either more or less permeable than the lower bed. The method of calculation is described in detail. This article is based on the report the author made at the conference on the problems of a compound utilization of water resources of the Ukrainskaya SSR, which took place in April 1958 in Kiyev. There are 3 tables, 3 diagrams, and 8 references, 7 of which are Soviet and 1 Japanese.

Card 1/1

10(4) 05779

AUTHOR: Fil'chakov, P.F. (Kiyev) SOV/41-11-4-5/15

TITLE: Hydrodynamic Calculation of Drained Aprons.I

PERIODICAL: Ukrainskiy matematicheskiy zhurnal, 1959,Vol 11, Nr 4,pp 393-407 (USSR)

ABSTRACT: Starting from the methods of the Academician N.N.Pavlovskiy (conformal mapping) the author obtains a strong hydrodynamic solution for the general case of a flat split apron under the assumption that the porous ground is homogeneous and infinitely deep ($T = \infty$). The author gives explicit formulas for the characteristic terms. He considers special cases (flat apron with band drainage, flat apron with a flat split in the upstream apron, drainage or upstream apron split of arbitrary form). The solution in the case $T < \infty$ is indicated and shall be given in the next publication. The author mentions: Academician Ye.A.Zamarin, N.T. Meleshchenko, V.I.Aravin, S.N.Numerov, A.M.Senkov, A.V.Romanov, Academician P.Ya.Polubarinova-Kochina, A.A.Nichiporovich, V.S. Istomina, I.V.Titova, N.N.Verigin, Ya.Ye.Snitsar, A.Ye.Romanova, and B.B.Devison.- There are 6 tables, 4 figures, and 19 references, 18 of which are Soviet, and 1 Czecho-Slovakian

SUBMITTED: April 14, 1959

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16 (1)

AUTHOR: Fil'chakov, P. F. SOV/20-125-5-19/61

TITLE: On the Simulation of Axially-symmetric Potential Fields on Electrically Conducting Paper (O modelirovanii osesimmetrichnykh potentsial'nykh poley na elektroprovodnoy bumage)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 5, pp 1023-1026 (USSR)

ABSTRACT: Many problems of the field theory are axially-symmetric, and this is especially often the case in electron optics, in electrical- and radio-engineering, in hydromechanics and aeromechanics. M. A. Lavrent'yev (Ref 3) raised several new and very interesting axially-symmetric problems in the radiation theory. Axially-symmetric problems are usually simulated in an electrolytic trough. However, the errors caused by electrochemical processes as well as the complicated nature of experimental technique render the wide use of the "method of electric simulation" difficult. The present paper describes the methods of the simulation of axially-symmetric problems on electrically conducting paper. This method has hitherto been used only in the case of plane potential fields. The technique is very simple and differs in no way from that

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applied in the case of plane problems; the accuracy attained is fully satisfactory for many technical problems. In the axially-symmetric case the Laplace equation may be represented as follows: $\frac{\partial}{\partial r}\left(\frac{1}{r}\frac{\partial u}{\partial r}\right)+\frac{\partial}{\partial z}\left(\frac{1}{r}\frac{\partial u}{\partial z}\right)=0$. The specific conductivity of the medium along the r-axis must then be constant and must vary along the z-axis according to a linear law: σ_z = const, $\sigma_r = kr$ (k = const). The medium satisfying the aforementioned conditions may easily be simulated on the basis of an electrically conducting paper according to a scheme given by a figure. In the scheme the specific conductivity of the paper is represented by its thickness. The individual sheets of paper are glued together with electrically conductive glue for which the recipe has already previously been given by V. I. Panchishin (Ref 6). The glueing-together of the papers is described by the author. Some typical problems are then discussed: 1) Cylinder condenser. This problem serves the purpose of controlling and checking the quality of the production of the axially-

symmetric electrically conductive cardboard. Problem 2: Electrostatic lens. This lens consists of 3 infinitely thin electrodes, each of which has an opening with the radius R. The distance between the electrodes is R/2. Between the middle- and the outer electrodes a potential difference of 50 v is applied. The field of this lens which was determined by electrical simulation is shown by a diagram. In a table the results obtained by electrical simulation are compared with those obtained theoretically by means of the analytical method. In the case of this example the maximum relative error amounts to 5.3 %. At most of the points the relative error does not exceed 1 %. Ways and means of improving results are described. 3) The impact of an axially-symmetric beam impinging upon an unbounded plane wall. A figure shows the network of equipotential lines which was drawn on an axially-symmetric conductive cardboard. The same figure also shows the measuring device of the integrator EGDA-6/53, by means of which simulation was applied to all the problems discussed in the present paper. According to the example discussed, satisfactory results are obtained even by rough

approximation. Ways and means of improving the quality of the electrically conducting paper are pointed out. There are 3 figures, 2 tables, and 6 Soviet references.

ASSOCIATION: Institut matematiki Akademii nauk SSSR (Mathematics Institute of the Academy of Sciences, USSR)

PRESENTED: December 19, 1958, by N. N. Bogolyubov, Academician

SUBMITTED: December 11, 1958

PUKHOV, Georgiy Yevgen'yevich; FIL'CHAKOV, P.F., doktor fiz.-matem.nauk, otv.red.; LABINOVA, N.M., red.izd-va; RAKHLINA, N.P., tekhn.red.

[Electric simulation of rods and thin-walled structures] Elektricheskoe modelirovanie sterzhnevykh i tonkostennykh konstruktsii. Kiev, Izd-vo Akad.nauk USSR, 1960. 149 p. (MIRA 14:3)

(Electromechanical analogies)

PHASE I BOOK EXPLOITATION SOV/5638

Fil'chakov, Pavel Feodos'yevich

Teoriya fil'tratsii pod gidrotekhnicheskimi sooruzheniyami; t. 2 (The Theory of Percolation Beneath Hydrotechnical Structures; v. 2) Kiyev, Izd-vo AN UkrSSR, 1960. 255 p. 4,000 copies printed.

Sponsoring Agency: Akademiya nauk UkrSSR. Institut matematiki.

Resp. Ed.: Yu. D. Sokolov, Corresponding Member, Academy of Sciences UkrSSR; Ed. of Publishing House: O. M. Pechkovskaya; Tech. Ed.: V. Ye. Sklyarova.

PURPOSE: This book is intended for scientists, engineers, and students of hydraulic engineering.

COVERAGE: This volume discusses hydromechanical approximation methods in the theory of percolation beneath hydrotechnical structures based on the method of consecutive conformal mapping developed by Academician A. M. Lavrent'yev. The application of this method permits solution of a given problem for homogeneous and anisotropic soils in the most general form, as well as the

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The Theory of Percolation (Cont.) SOV/5638

development of a grapho-analytical method of computing filtration. The grapho-analytical method permits rapid (20-30 minutes) calculation of uplift pressure, velocity of retreat, and discharge for any apron with a practical profile and with finite and infinite depths of permeable soil, employing only a compass, ruler and four nomograms (given in Appendix I). The modeling of filtration problems on conducting paper (the EGDA method), basic problems of rational designing of the subterranean contour of hydrotechnical structures, rational disposition of pilings, effectiveness of horizontal and vertical paths of filtration, and construction of weir foundations with a given rate of filtration are also examined. No personalities are mentioned. There are 305 references: 232 Soviet, 28 English, 16 French, 20 German, 6 Czech, 2 Italian, and 1 Polish.

TABLE OF CONTENTS:

Card 2/7

FIL'CHAKOV, P.F. (Kiyev)

Hydrodynamic calculation of drained aprons. Part 2: Use of the method of successive conformal mappings. Ukr. mat. zhur. 12 no.4:439-462 '60. (MIRA 14:3)

(Conformal mappings)
(Hydraulic structures)

SHTOKALO, I.Z., adademik; MITROPOL'SKIY, Yu.A.; FIL'CHAKOV, P.F., doktor fiz-mat. nauk

Mikhail Alekseevich Laverent'ev; on his 60th birthday. Ukr. mat. zhur. 12 no.4:490-491 '60. (MIRA 14:3)

1. AN USSR (for Shtokalo). 2. Chlen-korrespondent AN USSR (for Mitropol'skiy).
(Lavrent'ev, Mikhail Alekseevich, 1900-)

OSTAPENKO, Vladimir Nikolayevich; FIL'CHAKOV, P.F., doktor fiz.-mat. nauk, otv. red.; MEL'NIK, T.S., red. izd-va; YEFIMOVA, M.I., tekhn. red.

[Mathematical problems concerning the protection of pipelines against electrolytic corrosion] Matematicheskie voprosy katodnoi zashchity truboprovodov ot korrozii. Kiev, Izd-vo Akad.nauk USSR, 1961. 60 p. (MIRA 15:2)
(Pipelines) (Electrolytic corrosion)

SHAPARINSKIY, N.A., inzh.; FIL'CHAKOV, P.F., prof.; [illegible], I.D., inzh.

Determining deflections of eccentrically compressed reinforced concrete construction elements. Bet. i zhel.-bet. no.1:39-40 Ja '61. (MIA 14:2)

(Columns, Concrete) (Strains and stresses)

S/763/61/000/000/013/013

AUTHOR: Fil'chakov, P. F.

TITLE: Determination of the constants of the Christoffel-Schwarz integral with the aid of generalized power series.

SOURCE: Nekotoryye problemy matematiki i mekhaniki. Novosibirsk, Izd-vo Sib. otd. AN SSSR, 1961, 236-252.

TEXT: The present paper tackles the problem of the constants of the Christoffel-Schwarz integral, posed some 90 years ago, for which up to this time no general and simple method has been proposed. The simplest existing solution is applicable in those instances when the Christoffel-Schwarz formula can be integrated in explicit form. The present paper applies power series (same author, AN SSSR, Dokl., v.139, no.1, 1961) to the determination of the constants of the Christoffel-Schwarz integral. The formulas obtained are in a form readily suitable for programming on high-speed electronic computers. A practical procedure therefor is outlined, and accuracy computations are shown. A numerical example is fully worked out. There are 6 figures, 4 tables, and 17 references (12 Russian-language Soviet, 4 German, and 1 Italian-language).

Card 1/1

22766

S/041/61/013/001/005/008
B112/B202

16.6800 16.6500

AUTHOR: Fil'chakov, P. F.

TITLE: Determination of the constants of the Christoffel-Schwarz integral by simulation on electrically conductive paper

PERIODICAL: Ukrainskiy matematicheskiy zhurnal, v. 13, no. 1, 1961, 72-78

TEXT: G. N. Polozhiy developed the method of determining the constants of the Christoffel-Schwarz integral by simulation on resistance paper. This method has been simplified by O. V. Tozoni. It is adapted to the ЭГДА (EGDA) integrator and consists in the measurement of the potential values φ_k at n-3 points of an n-gon consisting of resistance paper which has the potentials $\varphi = 0$ and $\varphi = 1$ along two adjacent sides. The common corner of these sides is insulated. Along the other sides of the polygon $\partial\varphi/\partial n = 0$. With the normalization $\xi_1 = -1$, $\xi_{n-1} = +1$, $\xi_n = \infty$ the required constants ξ_k ($k = 2,3,\ldots,n-2$) are given by the formula: $\xi_k = \cos \pi \varphi_k$. To increase the simulation accuracy, the author used a

Card 1/2

Determination of the...

double-layer resistance paper and took the arithmetic mean from various experiments. He gives three examples, the first of which was solved by L. V. Kantorovich by the method of the improper integrals, the second of which the author himself solved theoretically by the series method which permitted an absolute error estimation. Finally, the author discusses his method in the case of open polygons. There are 5 figures, 2 tables, and 10 Soviet-bloc references.

SUBMITTED: March 28, 1960

Card 2/2

S/021/61/000/004/001/013
D213/D303

16,3000 16.6500 16.4100

AUTHOR: Fil'chakov, P.F.

TITLE: An effective method for determining the constant of the Christoffel-Schwarz integral for an arbitrary quadrangle

PERIODICAL: Akademiya nauk Ukrayinskoyi RSR. Dopovidi, no. 4, 1961, 409 - 414

TEXT: The article proposes a method of approach in the problem of evaluating the constant of the Christoffel-Schwarz integral for an arbitrary quadrangle by means of a power series. The author observes that this method may easily be extended for the case of an arbitrary polygon. An arbitrary quadrilateral z (Fig. 1) is reflected in the half-plane by means of the Christoffel-Schwarz integral

$$z = D_1 \int \zeta^{\alpha_1 - 1} (1 - \zeta)^{\alpha_2 - 1} (1 - k\zeta)^{\alpha_3 - 1} d\zeta + D_2 , \quad (1)$$

Card 1/4

An effective method for ...

where the constants k, D_1, D_2, are to be determined. To evaluate the integral the following formula is used (each term being expanded as a binomial series):

$$I_l = \int_{1/k_l}^{1/k_j} \zeta^{\nu_l+\beta_l-1}\left(1-\frac{1}{k_l\zeta}\right)^{\alpha_j-1}(1-k_j\zeta)^{\alpha_j-1}\,d\zeta =$$

$$= -\frac{\sin\pi\beta_{l-1}}{\sin\pi\beta_l}k_l^{-\nu_l-\beta_l}\sum_{m=0}^{\infty}b_{\nu_l+m}^{(l-1)}A_{j\tau}^{(m)} + k_j^{-\nu_l-\beta_l}\sum_{m=0}^{\infty}b_{\nu_l-m}^{(l)}A_{i\tau}^{(m)}, \qquad (2)$$

where

де

$$i=1,2,3,\ldots;\ j=i+1;\ \tau=\frac{j}{i};\ \beta_1=\alpha_1;\ {}_n=\alpha_1+\alpha_1+\ldots+\alpha_n-n+1; \qquad (3)$$

$$b_0^{(l)}=\frac{\Gamma(\beta_l)\Gamma(\alpha_j)}{\Gamma(\beta_l+\alpha_j)};\ \frac{b_{n+1}^{(l)}}{b_n^{(l)}}=\frac{n+\beta_l}{n+\beta_l+\alpha_j};\ \frac{b^{(l)}{}_{n-1}}{b_{-n}^{(l)}}=\frac{n-\beta_l}{n+1-\beta_l}; \qquad (4)$$

$$A_{\nu\tau}^{(m)}=\alpha_m^{(\nu)}\left(\frac{k_j}{k_i}\right)^m;\ \frac{\alpha_{m+1}^{(\nu)}}{\alpha_m^{(\nu)}}=\frac{m+1-\alpha_\nu}{m+1};\ \alpha_0^{(\nu)}=1;\ \nu=i,j. \qquad (5)$$

Card 2/4

An effective method for ...

For $\beta_i = 0, 1, \ldots,$ (2) must be replaced by a function containing a logarithmic (instead of sine) function. From (1), it follows by expanding the term $(1 - k)^{a_3 - 1}$ and finding the coefficients from (5), that

$$l_1 = /D_1/ \; b_o^{(1)} \sum_{n=0}^{\infty} A_n k^n; \; A_o = 1; \; \frac{A_{n+1}}{A_n} = \frac{(n + 1 - \alpha_3)(n + \alpha_1)}{(n + 1)(n + \alpha_1 + \alpha_2)}. \quad (6)$$

The formula for k, the coefficients of Γ_c, and the zero, first and second approximations for k are also given. Further accuracy may be obtained by applying Newton's formula. Various examples are considered for which k is calculated exactly (see Fig. 1) and also in the zero, first and second approximation. It is found that the second approximation usually gives four significant figures, which is sufficiently accurate for many technical problems. There are 2 figures, 2 tables and four Soviet-bloc references.

Card 3/4

S/021/61/000/004/001/013
D213/D303

An effective method for ...

ASSOCIATION: Instytut matematyky AN URSR (Institute of Mathematics AS UkrSSR)

SUBMITTED: December 22, 1960

Fig. 1.

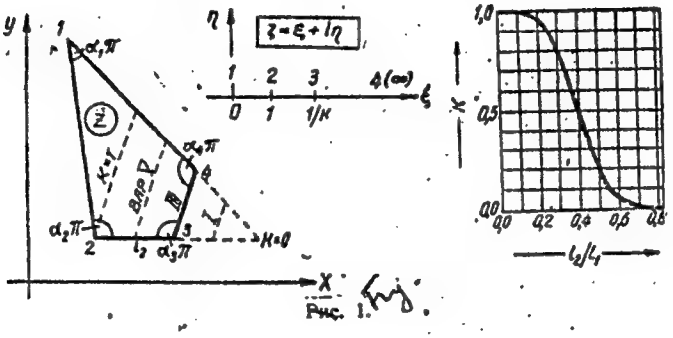

Рис. 1.

Card 4/4

FIL'CHAKOV, P.F.

Method for determining the constants of the Christoffel-Schwarz integral. Dokl. AN SSSR 139 no.1:44-47 Jl '61. (MIRA 14:7)

1. Institut matematiki AN USSR. Predstavleno akademikom M.A. Lavrent'yevym.
(Mathematical analysis)

16.3000,

S/041/62/014/003/004/005
B172/B186

AUTHOR: Fil'chakov, P. F. (Kiyev)

TITLE: Approximation method for conformal mapping of simply-connected univalent regions

PERIODICAL: Ukrainskiy matematicheskiy zhurnal, v. 14, no. 3, 1962, 308 - 321

TEXT: First, an arbitrary, simply-connected univalent region without cuts is examined which can be mapped by an elementary function on a region Z constituted from the upper half-plane by removal of a section on the real axis. Formulations of the form

$$\zeta = z + \frac{a_1}{z} + \frac{a_2}{z^2} + \ldots,$$

$$\zeta = b_0 + b_1 z + b_2 z^2 + \ldots$$

are used for the conformal mapping of Z on the complete upper half-plane. A linear set of equations, whose coefficients are calculated from a

Card 1/2

S/041/62/014/003/004/005
B172/B186

Approximation method for...

recurrence formula, is obtained for a_j and b_j by association of a finite or infinite number of boundary points ξ_i, z_i and by substituting $\sum_i (\mathrm{im}\,\xi)^2 = \min$ for the condition $\mathrm{im}\,\xi = 0$. The suitability of this method is illustrated by three examples. The last part of the article shows the application of the method to a region with a finite number of cuts. Formulas for the calculation of the problem are easy to program on high-speed computers. There are 4 figures and 2 tables. The most important English-language reference is: R. Cherchill, Complex Variables and Applications, 2 Ed., N.-Y., Toronto, London, 1960.

SUBMITTED: December 8, 1960

Card 2/2

SHAMANSKIY, Vladimir Yevtikhiyevich; EIL'CHAKOV, P.F., doktor fiz.-mat. nauk, otv. red.; MEL'NIK, T.S., red.; RAKHLENA, N.P., tekhn. red.

[Methods for the numerical solution of boundary value problems using an electronic digital computer] Metody chislennogo resheniia kraevykh zadach na ETsVM. Kiev, Izd-vo AN Ukr.SSR. Pt.1. [Linear boundary problems] Lineinye kraevye zadachi. 1963. 195 p. (MIRA 17:1)

PUTYATA, Vsevolod Iosifovich; SIDLYAR, Mikhail Makarovich; FIL'CHAKOV, P.F., doktor fiz.-mat. nauk, retsenzent; BALYASNA, O.Ye.[Baliasna, O.IE.], red.; KHOKHANOVSKAYA, T.I.[Khokhanovs'ka, T.I.], tekhn. red.

[Hydroaeromechanics] Gidroaeromekhanika. Kyiv, Vyd-vo Kyivs'-kogo univ. 1963. 479 p. (MIRA 16:7)
(Fluid mechanics)

L 13388-63 BDS/EWT(d)/EWT(l)/FCC(w) AFFTC IJP(C)/TF
ACCESSION NR: AP3003322 S/0041/63/015/002/0158/0172

AUTHOR: Fil'chakov, P F. (Kiev) 54

TITLE: Conformal mapping of given regions by the trigonometric interpolation method. I. 16

SOURCE: Ukrainskiy matematicheskiy zhurnal, v. 15, no. 2, 1963, 158-172

TOPIC TAGS: conformal mapping, prescribed precision, trigonometric interpolation

ABSTRACT: The author presents a method for constructing a conformal mapping of given regions based on trigonometric interpolation which, with simple computation of formulas, ensures any prescribed accuracy for a rather wide class of regions occurring in the solution of practical problems. The contour may be given analytically, graphically, or only as a discrete series of points. Orig. art. has: 57 formulas, 2 figures, and 2 tables.

ASSOCIATION: none

SUBMITTED: 24Apr62 DATE ACQ: 24Jul63 ENCL: 00
SUB CODE: 00 NO REF SOV: 008 OTHER: 000

Card 1/1

FIL'CHAKOV, P.F. (Kiyev)

Conformal mapping of given regions by the method of trigonometric interpolation. Ukr.mat. zhur. 16 no.6:811-821 '64
(MIRA 18:2)

FUKHOV, Georgiy Yevgen'yevich; FIL'CHAKOV, P.F., doktor fiz.-mat. nauk, otv. red.; LABINOVA, N.M., red.

[Selected problems in the theory of computers] Izbrannye voprosy teorii matematicheskikh mashin. Kiev, Izd-vo AN Ukr.SSR, 1964. 263 p. (MIRA 17:7)

FIL'CHAKOV, Pavel Feodos'yevich; SAVIN, G.N., akademik, otv. red.

[Approximate methods of conformal mapping; reference book] Priblizhennye metody konformnykh otobrazhenii; spravochnoe rukovodstvo. Kiev, Naukova dumka, 1964. 530 p. (MIRA 18:1)

1. Akademiya nauk Ukr.SSR (for Savin). 2. Chlen-korrespondent AN Ukr.SSR (for Fil'chakov).

MITROPOL'SKIY, Yu.A., otv. red.; BEREZANSKIY, Yu.M., red.; BREUS, K.A., red.; ZMOROVICH, V.A., red.; LYASHKO, I.I., red.; MARCHENKO, V.A., red.; PARASYUK, O.S., red.; POLOZHIY, G.N., red.; FIL'CHAKOV, P.F., red.; KULAKOVSKAYA, N.S., red.

[Mathematical physics] Matematicheskaia fizika. Kiev, Naukova dumka, 1965. 156 p. (MIRA 18:8)

1. Akademiya nauk URSR, Kiev.

L 2905-66 EWT(d)/EWT(1)/EWA(d)/T/EED(b)-3 IJP(c)

AM5011008 BOOK EXPLOITATION 29 UR/ 8+1.

Fil'chakov, Pavel Feodos'yevich (Corresponding Member of the Academy of Sciences of the Ukrainian SSR) 94,55

Approximation methods of conformal mapping; a manual (Priblizhennyye metody konformnykh otobrazheniy; spravochnoye rukovodstvo) Kiev, Naukova dumka, 1964. 530 p. illus., biblio. (At head of title: Akademiya nauk Ukrainskoy SSR) Errata slip inserted. 4700 copies printed. --- Supplements (Prilozheniya), 1-4, 40 p.

TOPIC TAGS: conformal mapping, approximate conformal mapping

PURPOSE AND COVERAGE: This book is a manual on numerical approximate methods of conformal mapping and their practical realization. The first chapter contains a brief elucidation of the theory of functions of a complex variable as essential background for understanding the following chapters. The second chapter deals with conformal mappings that can be realized by given functions, the Riemann theorem, and the principles of conformal mapping. The third chapter presents simple approximate methods for constructing the corresponding mapping functions for any simply-connected or doubly-connected region with a given degree of accuracy. Effective formulas are given for determining the constants of the Christoffel-

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L 2905-66

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Schwarz integral. Applications of the theory of conformal mapping to engineering problems, particularly filtration problems, are given. There are numerous examples worked out to final numerical values. The appendix contains all essential formulas and stencils which greatly facilitate the construction of sought mapping functions. The book is intended for a wide range of readers -- students, engineers, graduate students, and scientific workers in aerodynamics, elasticity theory, heat engineering, filtration, electrical engineering, and electronics engineering.

TABLE OF CONTENTS (abridged)

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Appendixces:

I. Computational formulas for mapping E_n, E_n^{-1}, $E\Lambda_n$, Λ_n^{-1} -- 3
II. Stencils for symmetrical regions (q = 2) -- 7
III. Stencils for asymmetrical regions (q = 0) -- 17
IV. Stencils for exterior domains (q = 2) -- 36

SUB CODE: MM SUBMITTED: 03Aug64 NO REF SOV: 324

OTHER: 050

Card 6/6

L 04717-67 EWT(m)/EWP(v)/EWP(t)/ETI/EWP(k) IJP(c) JD/HM

ACC NR: AP6027430 SOURCE CODE: UR/0125/66/000/007/0012/0015

AUTHOR: Fil'chakov, P. F.; Tarapon, A. G.; Burykin, A. Ya.; Rysbov, V. R.

ORG: [Fil'chakov; Tarapon; Burykin] Mathematics Institute AN UkrSSR (Institut matematiki AN UkrSSR); [Rysbov] Institute of Electric Welding im. Ye. O. Paton AN UkrSSR (Institut elektrosvarki AN UkrSSR)

TITLE: Investigation of the nonstationary heat field in the bimetal aluminum-steel

SOURCE: Avtomaticheskaya svarka, no. 7, 1966, 12-15

TOPIC TAGS: bimetal, aluminum, steel, welding technology, heat transfer, heat conduction, simulation, graphic technique

ABSTRACT: A method is described for simulating unstationary heat fields on electrically conducting paper. This method makes it possible to find the general principles of heat diffusion in the welding of metals in different combinations without resorting to complex experiments. Transitional heat fields were determined for different bimetallic combinations of AD1 or AMg6 aluminum and St.3 or 1Kh18N9T steel. The relationship was established between the time required for transition

Card 1/2 UDC: 621.791:669.14:669.71:536.12

L 04717-67
ACC NR: AP6027430

lines to reach unsafe temperatures and the ratio of the thicknesses and the thermophysical properties (heat conductivity and specific heat) of the dissimilar metals to be joined. Nomograms were constructed for calculating the time required for the aluminum-steel bimetal transition lines to attain critical temperatures (over 520°C). Orig. art. has: 1 table and 7 equations.

SUB CODE: 11, 13, 20/ SUBM DATE: 09Mar65/ ORIG REF: 003

Card 2/2 afs

FIL'CHAKOV, V.I.; BOBROV, O.D., inzh.

Manufacture of air-entrained ash and sand lightweight tiles.
Stroi. mat. 8 no.2:23-25 F '62. (MIRA 15:3)

1. Nachal'nik laboratorii Stupinskogo zavoda yacheistykh betonov.

(Tiles)

GORENSHTEYN, M.M., kand.tekhn.nauk; KIRILLOV, B.S., kand.tekhn.nauk; TKACHENKO, V.K., inzh.; GOLUVENKO, A.I., inzh.; POGORZHEL'SKIY, V.I., inzh.; BARANETS, P.D., inzh.; YASHCHENKO, Z.A., inzh.; FIL'CHAKOVA, V.A., inzh.

Establishing the most satisfactory conditions for rolling on blooming mills with increased load on the main driving motor. Izv. vys. ucheb. zav.; chern. met. no.3:91-101 Mr '58. (MIRA 11:5)

1.Zhdanovskiy metallurgicheskiy institut i zavod "Azovstal'". (Rolling mills--Electric driving)

FILIPPOV, I.N.; GUNIN, I.V.; Prinimali uchastiye: DABAGYAN, N.P.; CHETVERIKOV, A.V.; MIROSHNICHENKO, V.G.; FRADIN, M.D.; PAVLOVSKIY, V.Ya.; FIL'CHAKOVA, V.A.; ALEKSANDROVA, L.A.; DUBROVIN, F.S.

Investigating the buckling of webs on lightweight I-beams. Stal' 23 no.10:915-918 O '63. (MIRA 16:11)

1. Ukrainskiy institut metallov. 2. Ukrainskiy institut metallov (for Dabagyan, Chetverikov, Miroshnichenko). 3. Zavod "Azovstal'" (for Fradin, Pavlovskiy, Fil'chakova, Aleksandrova, Dubrovin).

L 15136-65 EWT(d) IJP(c)/ESD(t)/ESD(gs)/AEDC(a)/SSD/AFWL/ASD(a)-5

ACCESSION NR: AP4045894 S/0021/64/000/009/1127/1132

AUTHOR: Fil'chakova, V. P.

TITLE: A numerical method for conformal mapping of the outside of simply connected regions

SOURCE: AN UkrRSR. Dopovidi, no. 9, 1964, 1127-1132

TOPIC TAGS: conformal mapping, conformal transformation, simply connected region, trigonometric interpolation, aerodynamic airfoil

ABSTRACT: A numerical method is proposed for conformal mapping of the outside of a unit circle $|\xi| \geq 1$ into the outside of the simply connected region $z = x + iy$ using the conformal transformation in the form

$$z = \sum_{n=-1}^{m-2} C_n \zeta^{-n} = \sum_{n=-1}^{m-2} (A_n + iB_n) r^{-n} (\cos n\varphi - i \sin n\varphi),$$

where $C_n = A_n + ib_n$ and $A \to a_n$ and $B_n \to b_n$ when $m \to \infty$. The proposed method is developed in connection with the problem of flow past

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L 15136-65
ACCESSION NR: AP4045894

aerodynamic airfoils. To determine the coefficients A_n and B_n, the unit circle is divided into 2m equal parts and an even system of division points $r = 1$; $\varphi_{2k} = 2k\pi/m$ also the system of odd division points $r = 1$, $\varphi_{2k-1} = (2k-1)\pi/n$ ($k = 1,2,\ldots, m$) is considered. The images of these points in the plane L are called modes. Expressions for A_i and B_i are derived in terms of the coordinates of modes, the location of which is unknown. For determining the location of modes with required accuracy and, consequently, for determining the conformal transformation coefficients A_i and B_i, an iterative scheme is proposed. A trial and error method is applied for determining zero approximations. An example showing the determination of the conformal transformation which maps the outside of the unit circle into the outside of a certain contour L defined by a table of values is presented. Orig. art. has: 6 formulas and 1 figure.

ASSOCIATION: Instytut matematyky AN UkrSSR (Institute of Mechanics, UkrSSR)

SUBMITTED: 19Mar64 ENCL: 00 SUB CODE: MA

NO REF SOV: 002 OTHER: 000

Card 2/2

L 02523-67 EWT(1)/EWP(m) WW

ACC NR: AT6020968 SOURCE CODE: UR/3207/65/000/002/0019/0026

AUTHOR: Fil'chakova, V. P. 34 B+1

ORG: Institute of Mathematics, AN UkrSSR (Institut matematiki

TITLE: Solution of the direct problem of the potential flow of an incompressible fluid past hydrodynamic grids with arbitrary geometric parameters by the method of trigonometric interpolation

SOURCE: Gidroaeromekhanika, no. 2, 1965, 19-26

TOPIC TAGS: incompressible flow, incompressible fluid, interpolation

ABSTRACT: The article considers the infinitely connected regions G and Γ in the complex variables $z = x + iy$ and $\zeta = \xi + i\eta$, where G is the exterior of a grid of individual circles; Γ is the exterior of a grid of profiles L; t is the grid spacing of the circles; t' is the grid spacing of the profiles (see Fig. 1)

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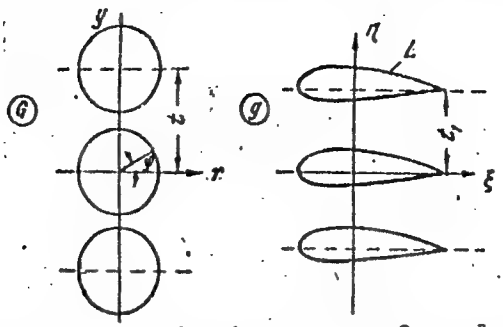

Fig. 1.

A function is constructed which gives a conformal transformation of region G to g:

$$\zeta = Az + \frac{\pi}{l}\sum_{n=0}^{\infty}\frac{(-1)^n}{n!}A_{-(n+1)}\frac{d^n}{dz^n}\operatorname{cth}\frac{\pi z}{l}, \qquad (1)$$

or, using the well-known concept of the hyperbolic cotangent, in the form of a series

$$\zeta = Az + \sum_{n=1}^{\infty}\frac{A_{-n}}{z^n} + \sum_{n=0}^{\infty}A_n z^n,$$

where

$$A_n = \sum_{k=1}^{\infty}\frac{(-1)^{n+1}2^{2k}B_k\left(\frac{\pi}{l}\right)^{2k}A_{-(2k-n)}}{2k(2k-n-1)!n!}$$

; B_k is the Bernoulli number

L 02523-67

ACC NR: AT6020968 O

The problem is solved using trigonometric interpolation to find the coefficients of Laurent series. Orig. art. has: 19 formulas and 7 figures.

SUB CODE: 20/ SUBM DATE: none/ ORIG REF: 007

Card 3/3 dgk

L 14434-66 EWT(d)/T IJP(c)

ACC NR: AP6002641 SOURCE CODE: UR/0021/65/000/011/1403/1406

AUTHOR: Fil'chakova, V. P.

ORG: Institute of Mathematics, AN UkrSSR (Institut matematiki AN URSR)

TITLE: A numerical method of conformal mapping of polygonal lattice regions

SOURCE: AN UkrRSR. Dopovidi, no. 11, 1965, 1403-1406

TOPIC TAGS: Riemann space, conformal transformation mapping

ABSTRACT: The author studies the conformal mapping of polygonal lattices of a z plane onto a Riemannian surface in the ζ region in a system of concentric multisheet circles of unit radius. Using the integral formula of L. I. Sedov (Ploskiye zadachi gidrodinamiki i aerodinamiki, Gostekhizdat, L., 1950) which is an extension of the Christoffel-Schwartz integral to the case of polygonal lattices, the representation of the mapping function is obtained as a sum of three series which converge everywhere inside the unit circle including the boundary. A system of equations is derived for the determination of the pertinent constants and their use is illustrated on a simple polygonal lattice example. The paper was presented by Academician Yu. O. Mitropol'skiy, Member of AN UkrSSR. Orig. art. has: 11 formulas and 1 figure.

SUB CODE: 12 / SUBM DATE: 13Mar65 / OTH REF: 001

Card 1/1

L 52297-65 EWT(d)/T IJP(c)
ACCESSION NR: AP5011591 UR/0103/65/001/003/0084/0095

AUTHOR: Fil'chakova, V. P. (Kiev)

TITLE: Conformal mapping of external domains by the method of trigonometric interpolation

SOURCE: Prikladnaya mekhanika, v. 1, no. 3, 1965, 84-95

TOPIC TAGS: conformal mapping, complex function, trigonometric series, approximation method, numerical procedure, numerical method

ABSTRACT: A numerical method was developed to insure mapping of functions for singly-connected external domains bounded by simple closed curves to any degree of required accuracy. Consider the mapping of the exterior of the unit circle $|\zeta| \geq 1$ onto the exterior of a given singly-connected domain $z = x + iy$. The mapping function is normalized by the condition $z = f(\zeta)\big|_{\zeta=\infty} = \infty$ $z = f(\zeta)\big|_{\zeta=1} = z_0$ and written as a polynomial

$$z = \sum_{n=-1}^{m-2} C_n \zeta^{-n} = \sum_{n=-1}^{m-2} (A_n + iB_n)\zeta^{-n}(\cos n\varphi - i \sin n\varphi) \quad (1)$$

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L 52297-65
ACCESSION NR: AP5011591

To determine the coefficients A and B, the real and the imaginary parts are written separately, and the following expressions are obtained

$$A_l = \frac{1}{m}\sum_{k=1}^{m} x_k \cos l\varphi_k - y_k \sin l\varphi_k, \quad l = -1, 0, \ldots, m-2; \tag{2}$$

$$B_l = \frac{1}{m}\sum_{k=1}^{m} x_k \sin l\varphi_k + y_k \cos l\varphi_k$$

From these, an iteration procedure is constructed in terms of nodal points

Card 2/5

$$x_{2\nu-1}^{(n)} = \sum_{k=1}^{m} x_{2k}^{(n)} \gamma_{2k,\,2\nu-1}^{II(m)} - y_{2k}^{(n)} \gamma_{2k,\,2\nu-1}^{I(m)}$$

$$y_{2\nu-1}^{(n)} = \sum_{k=1}^{m} x_{2k}^{(n)} \gamma_{2k,\,2\nu-1}^{I(m)} + y_{2k}^{(n)} \gamma_{2k,\,2\nu-1}^{II(m)} \qquad (3)$$

$$x_{2\nu}^{(n+1)} = \sum_{k=1}^{m} x_{2k-1}^{(n)} \gamma_{2k-1,\,2\nu}^{I(m)} - y_{2k-1}^{(n)} \gamma_{2k-1,\,2\nu}^{II(m)}$$

$$y_{2\nu}^{(n+1)} = \sum_{k=1}^{m} x_{2k-1}^{(n)} \gamma_{2k-1,\,2\nu}^{II(m)} + y_{2k-1}^{(n)} \gamma_{2k-1,\,2\nu}^{I(m)} \qquad (4)$$

[illegible] based on the basis of the graphical considerations, [illegible] points are selected for zeroth approximation [illegible]

(0) [illegible] ($k = 1,2,\ldots$) and from the iteration equations (3) the approximate [illegible] points are calculated which, in general, will not lie on the contour. [illegible] approximate over nodal points are [illegible] calculated, carried

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or the contour, and taken as new inputs for the first approximation of the even [illegible]. The iteration process is repeated until the [illegible] is [illegible]. To simplify this [illegible] points are grouped as follows

$$X_k^{+++} = x_k \pm x_{k+1} + x_{k+m} \pm x_{k+m+1}; \quad X_k^{---} = x_k \mp x_{k+1} - x_{k+m} \pm x_{k+m+1};$$

$$Y_k^{+++} = y_k \pm y_{k+1} + y_{k+m} \pm y_{k+m+1}; \quad Y_k^{---} = y_k \mp y_{k+1} - y_{k+m} \pm y_{k+m+1};$$

$$Z_k^{+--} = z_k \mp z_{k+1} - z_{k+m} \pm z_{k+m+1}; \quad U_k^{+--} = u_k \mp u_{k+1} - u_{k+m} \pm u_{k+m+1};$$

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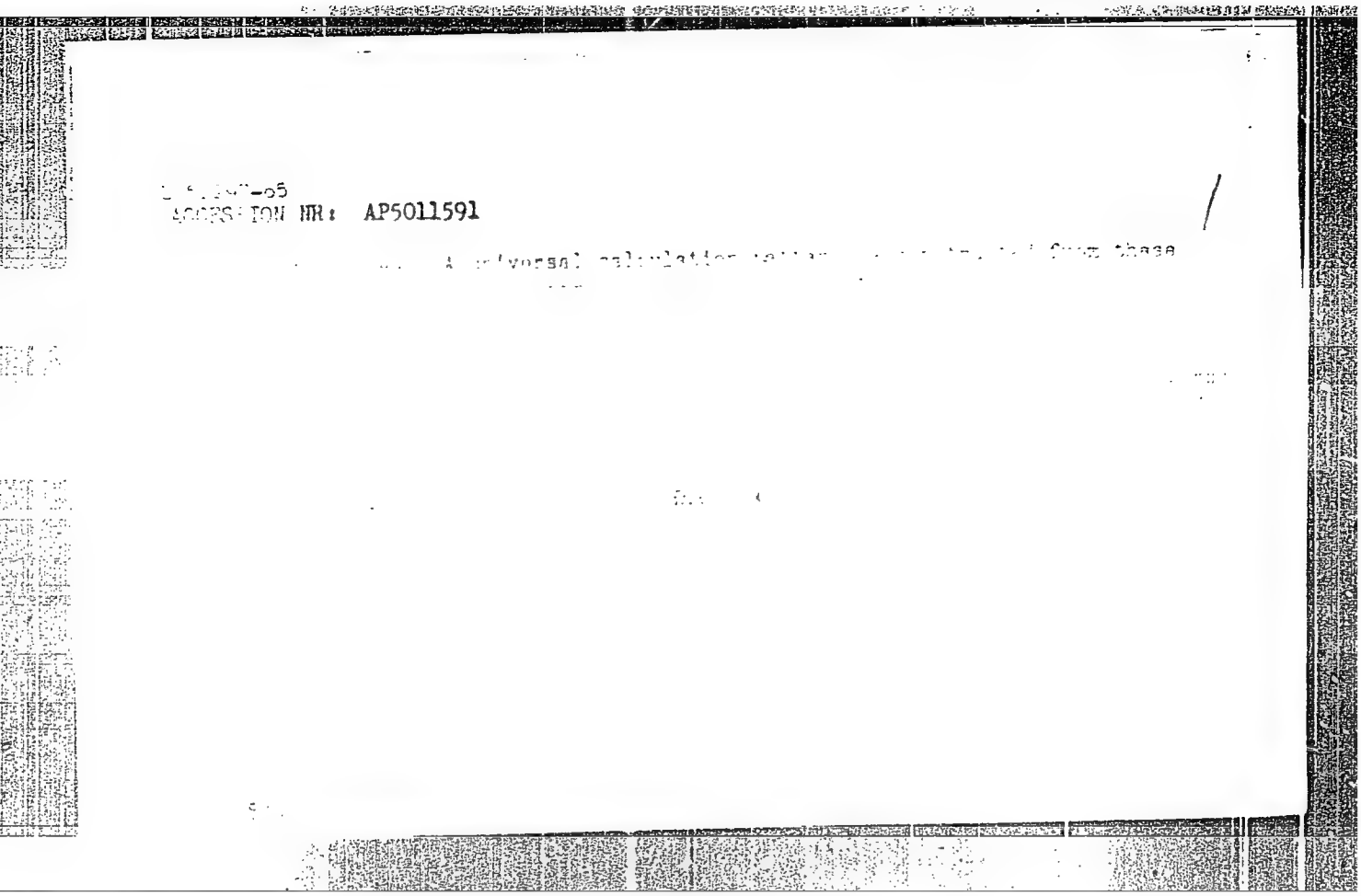

ACCESSION NR: AP5011591

L 11635-66 EWT(d)/T LJP(c)

ACC NR: AP6001087 SOURCE CODE: UR/0041/65/017/006/0080/0090

33
B

AUTHOR: Fil'chakova, V. P.

ORG: none

TITLE: Construction of generalized Laurent series for infinitely connected single periodic regions

SOURCE: Ukrainskiy matematicheskiy zhurnal, v. 17, no. 6, 1965, 80-90

TOPIC TAGS: complex variable, ~~conformal~~ mapping function, periodic function, function theory

ABSTRACT: A mapping function is sought for infinitely connected lattice regions in the form of a generalized Laurent series. Relations between the coefficients of the mapping function, the step of the lattice of circles and the node points are obtained. From these relations (obtained via trigonometric interpolation) are determined the desired coefficients and the step of the canonical lattice. Orig. art. has: 20 formulas and 2 figures.

SUB CODE: 12/ SUBM DATE: 06Mar65/ ORIG REF: 005/ OTH REF: 001

Card 1/1

L 27526-66 EWT(d)/T IJP(c)

ACC NR: AP6007754 SOURCE CODE: UR/0021/66/000/001/0016/0020

AUTHOR: Fil'chakova, V. P.

ORG: Institute of Mathematics AN UkrSSR (Instytut matematyky AN URSR)

TITLE: Conformal mapping of infinitely-connected lattice regions on the interior of a lattice of circles

SOURCE: AN UkrRSR. Dopovidi, no. 1, 1966, 16-20

TOPIC TAGS: conformal mapping, complex function, convergent series

ABSTRACT: The author seeks the mapping function for an infinitely-connected lattice region in the form of a segment of a generalized Laurent series

$$\zeta = cz + \sum_{n=1}^{n=1} c_{-n} z^{(-n)}, \quad c_{-n} = a_{-n} + ib_{-n}, \qquad (1)$$

Formulas are obtained for the symmetrical and antisymmetrical nodal points in terms of the coefficients c_{-n} by analyzing the mapping on the unit circle of the corresponding profile in the respective lattices of unit circles and profiles. An iteration process is used to determine the positions of the nodal points. Relations are obtained between the coefficients of the mapping function, the pitch of the circle lattice, and the nodal points. These relations make it possible to determine the sought coefficients and the pitch of the canonical lattice. This report was presented

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L 27526-66

ACC NR: AP6007754 0

by Academician AN UkrRSR Yu. O. Mytropol's'kyy (Yu. A. Mitropol'skiy). Orig. art. has: 5 figures and 1 formula.

SUB CODE: 12/ SUBM DATE: 16Feb65/ ORIG REF: 002

Card 2/2 BLG

ANDREYEV, Semen Ivanovich, kand. geol.-miner. nauk; YEFREYKIN, A.K., prof., doktor biol. nauk, red.; FIL'CHENKO, R.D., red.; DEOMIDOV, N.D., tekhn. red.

[Soil erosion control; manual for agricultural workers in the Chuvash A.S.S.R.]Bor'ba s eroziei pochv; rukovodstvo dlia rabotnikov sel'skogo khoziaistva Chuvashskoi ASSR. Cheboksary, Chuvashskoe knizhnoe izd-vo, 1962. 91 p. (MIRA 15:12)
(Chuvashia--Soil conservation)

MAMONTOV, I.M.; KONDAKOV, N.I.; ARKHIPOV, G.Ye.; SERGEYEV, A.S., kand. sel'khoz. nauk; PETROV, Ya.P.; GUR'YEV, D.G.; STUPALOV, Yu.G.; FIL'CHENKO, R.D., red.; PETROV, G.P., tekhn. red.

[Measures for protecting farm plants, fruit and berry plantations, and forests against pests and diseases in the Chuvash A.S.S.R. in 1962] Meropriiatiia po zashchite sel'skokhoziaistvennykh rastenii, plodovo-iagodnykh nasazhdenii i lesov ot vreditelei i boleznei po Chuvashskoi ASSR na 1962. (MIRA 16:4)
74 p.
1. Chuvash A.S.S.R. Ministerstvo proizvodstva i zagotovok sel'skokhozyaystvennykh produktov. Respublikanskaya stantsiya po zashchite rasteniy.
(Chuvashia—Plants, Protection of)

MARTINSON, Ye., kand.khim.nauk; FIL'CHENKOV, N., inzh.; PLESHCHENKO, Ye., inzh.

Moisture indicator for hermetically sealed refrigerating machinery. Khol.tekh. 37 no.3:22-24 My-Je '60. (MIRA 13:7)
(Refrigeration and refrigerating machinery)

FIL'CHENKO, Nikolay Vasil'yevich; AFONIN, L., red.; NEMYTOV, V., tekhn.red.

[The seven-year plan of Orel Province] Semiletka Orlovskoi oblasti. Orel, Orlovskoe knizhnoe izd-vo, 1959. 120 p. (MIRA 13:5)

(Orel Province--Economic policy)

ZHIKHAREV, Fedor Petrovich; BONDARENKO, N.V., starshiy nauchnyy sotrudnik; FIL'CHENKO, R.D., red.; STEPANOV, N.S., tekhn. red.

[Developing the forms of wage payment on the collective farms of the Chuvash A.S.S.R.] Razvitie form oplaty truda v kolkhozakh Chuvashskoi ASSR. Cheboksary, Chuvashskoe gos. izd-vo, 1960. 145 p. (MIRA 14:9)

1. Chuvashskiy nauchno-issledovatel'skiy institut yazyka, literatury, istorii i ekonomiki pri Sovete Ministrov Chuvashskoy ASSR (for Bondarenko).

(Chuvashia—Collective farms—Income distribution)

FIL'CHENKOV, I.F., insh.

Quality control of building materials, reinforced concrete structures, and earthwork. Energ.stroi. no.5:216-220 '58. (MIRA 12:5)

1. Zamestitel' nachal'nika OISMK.
(Volga Hydroelectric Power Station--Quality control)

FIL'CHENKOV, I.F., inzh.; MALYSHEV, N.I., inzh.

Concrete based on artificial sand obtained from the wastes of crushing carbonate rock. Sbor.trud.VNIINerud no.1:40-54 '62. (MIRA 15:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut nerudnykh stroitel'nykh materialov i gidromekhanizatsii.
(Concrete) (Rocks, Carbonate)

FIL'CHENKOV, N., inzh.

Moisture in hermetic refrigeration systems [with summary in English]. Khol.tekh. 37 no.2:17-21 My-Ap '60. (MIRA 13:10)

1. Moskovskiy avtozavod im. I.A.Likhacheva.
(Refrigeration and refrigerating machinery)

KARPOV, V., inzhener; FIL'CHENKOV, M., inzhener.

Halide electron GTI-1 leak detector. Khol.tekh. 32 no.4:28-31 O-D '55. (MLRA 9:4)
(Refrigeration and refrigerating machinery)(Halides)

FIL'CHENKOV, N., inzh.

Drying cartridges of hermetically sealed refrigerating plants.
Khol.tekh. 37 no.4:56-59 Jl-Ag '60. (MIRA 13:11)
(Refrigeration and refrigerating machinery)
(Drying apparatus)

KRUGLYAK, I.N.; FIL'CHENKOV, N.A.; GOLOVCHENKO, K.S.; VEYNBERG, B.S., kand. tekhn. nauk, retsenzent; KUBAREV, V.I., inzh., red.

[Domestic compressor-type refrigerators] Domashnie kompressionnye kholodil'niki. Izd.2. Moskva, Izd-vo "Mashinostroenie," 1964. 206 p. (MIRA 17:8)

ACCESSION NR: AP4042565 S/0056/64/046/006/2042/2045

AUTHORS: Dzhelepov, V. P.; Yermolov, P. F.; Katy*shev, Yu. V.; Moskalev, V. I.; Fil'chenkov, V. V.; Friml, M.

TITLE: Catalysis of the nuclear $d + d \rightarrow He^3 + n$ fusion reaction by negative muons

SOURCE: Zh. eksper. i teor. fiz., v. 46, no. 6, 1964, 2042-2045

TOPIC TAGS: nuclear fusion, muon, mu meson catalysis, negative mu meson, hydrogen, deuterium

ABSTRACT: This is a continuation of earlier research on mesic-atom processes in gaseous hydrogen (V. P. Dzhelepov et al., Proc. 1962 Intern. Conf. on High Energy Physics at CERN, Geneva, 1962, p. 484. V. P. Dzhelepov, At. energiya v. 14, 27, 1963. V. P. Dzhelepov et al., ZhETF v. 42, 439, 1962), and is aimed at observation of the previously unobserved reaction $d\mu + d \rightarrow dd\mu \rightarrow He^3 + n + \mu^-$. This

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reaction is one of the fusion reactions

$$d\mu + d \rightarrow dd\mu \rightarrow \begin{cases} t + p + \mu^- \\ He^3 + n + \mu^- \\ p\mu + t \\ He^3\mu + n \\ t\mu + p \end{cases}$$

which were investigated earlier. The experimental conditions made it also possible to register reaction (1) and obtain some estimates of the yields of reactions (3) and (4). The tests were made with a diffusion chamber filled with deuterium to a pressure of 7.2 atm, where 20 events of the hitherto unobserved reaction (2) were detected. The ratio of the yields of reactions (2) and (1) is 1.20 ± 0.37. Estimates of the relative yields of reactions (3) and (4) give, with a probability of 90%, $w(3)/w(1) < 0.13$ and $w(4)/w(2) < 0.13$. The yield of the reaction (1) agrees with the data obtained by the authors earlier, but the yields of reactions (1) and (2) measured in

ACCESSION NR: AP4042565

the experiments exceed by one order of magnitude those that can be expected on the basis of the data on reaction (1) obtained in liquid deuterium by several authors. Estimates of the yield of reaction (5) call for additional data reduction and will be published later. Orig. art. has: 2 figures and 5 formulas.

ASSOCIATION: Ob"yedinenny*y institut yaderny*kh issledovaniy (Joint Institute of Nuclear Research)

SUBMITTED: 10Feb64 DATE ACQ: ENCL: 00

SUB CODE: NP NR REF SOV: 003 OTHER: 005

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L 36462-66 EWT(m)

ACC NR: AP6018802 SOURCE CODE: UR/0056/66/050/005/1235/1251

AUTHOR: Dzhelepov, V. P.; Yermolov, P. F.; Moskalev, V. I.; Fil'chenkov, V. V.

ORG: Joint Institute of Nuclear Research (Ob"yedinennyy institut yadernykh issledovaniy)

TITLE: Negative muon catalysis of nuclear reactions of $d\mu + p \rightarrow He^3 + \mu^-$ and $d\mu + d \rightarrow t + p + \mu^-$ and the formation of $pd\mu$ and $dd\mu$ molecules in gaseous hydrogen

SOURCE: Zh eksper i teor fiz, v. 50, no. 5, 1966, 1235-1251

TOPIC TAGS: muon, hydrogen, deuterium, nuclear reaction, catalysis

ABSTRACT: The yield of nuclear reaction of $d\mu + p \rightarrow pd\mu \rightarrow He^3 + \mu^-$, and $d\mu + d \rightarrow dd\mu \rightarrow p + t + \mu^-$ have been measured in a diffusion cloud chamber filled with hydrogen and deuterium at pressures ranging from 7 to 23 atm.

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